Claims

I Claim:

1. A magnetically actuatable apparatus for a control system comprising:

a contact mountable to a first support member, said contact being movable between an open state and a closed state in the presence of magnetic flux, and

a magnetic actuator for selectively actuating the contact, said magnetic actuator being mountable to a second support member that is displaceable relative to the first support member, wherein said magnetic actuator has an effective region of magnetic flux of a magnitude and direction in excess of a region of magnetic flux for a given magnet so that the first support member can be displaced relative to the second support member a magnitude and direction in excess of the magnitude and direction of displacement obtainable using the given magnet, without a change in the electrical state of the contact.

2. The apparatus as recited in claim 1, wherein the control system is a physical monitoring system.

3. The apparatus as recited in claim 1, wherein the magnetic actuator comprises a plurality of spaced part, alike aligned magnetic fields arranged adjacent to one another along the second support member, wherein each of the plurality of magnetic fields have a pole of polarity that overlaps with a like pole of polarity of an adjacent magnet to further define the effective region of magnetic flux.

4. The apparatus as recited in claim 1, wherein the magnetic actuator comprises an elongated magnet having a pole of polarity along a lateral side to further define the effective region of magnetic flux.

5. The apparatus as recited in claim 4, wherein the effective region of magnetic flux has a magnitude and direction that duplicates at least two aligned, alike magnetic fields that are arranged with overlapping like magnetic fields.

6. The apparatus as recited in claim 1, wherein the contact is a switch having a first contact member and a second contact member, wherein at least one of the aforesaid contact members defines an axis that is arranged transverse to the effective region of magnetic flux.

7. The apparatus as recited in claim 6, wherein the first contact member is displaceable relative to the second contact to open and to close the contact and the control system is an alarm.

8. The apparatus as recited in claim 7, wherein the contact is in the open state in the presence of the effective region of magnetic flux.

9. The apparatus as recited in claim 8, wherein the contact is in the closed state in the presence of the effective region of magnetic flux.

10. The apparatus as recited in claim 7, wherein the alarm is settable when the contact is in the open state.

11. The apparatus as recited in claim 8, wherein the alarm is settable when the contact is in the closed state.

12. The apparatus as recited in claim 7, wherein the alarm is not-settable when the contact is in the open state.

13. The apparatus as recited in claim 8, wherein the alarm is not-settable when the contact is in the closed state.

14. A magnetically actuated apparatus for use with an electrically operated control system, said apparatus comprising:

a control device mountable to a first support member that is adapted to move relative to a second support member, said control device having a contact member that moves intermediate an open condition and a closed condition in response to magnetic flux to operate the control system, and

a magnetic actuator mountable to the second support member for actuating the control device, said magnetic actuator having an effective region of magnetic flux of a first magnitude and a first direction in excess of a region of magnetic flux of a given magnet having a second magnitude and a second direction,

wherein the effective region of magnetic flux allows the first support member to move relative to the second support member a greater distance than the region of magnetic flux of the given magnet, without a change in the condition of the control device.

15. The apparatus as recited in claim 14, wherein the control system is an alarm system.

16. The apparatus as recited in claim 15, wherein the control system is a physical monitoring system.

17. The apparatus as recited in claim 14, wherein the magnetic actuator comprises an assembly of aligned, alike magnetic fields having opposed magnetic fields of opposite polarity of a given magnitude, wherein like magnetic fields of each magnet overlap to further define the effective region of magnetic flux.

18. The apparatus as recited in claim 14, wherein the magnetic actuator comprises an elongated magnet having a longitudinal axis, opposed sides and an elongated magnetic field of like polarity extending laterally along said longitudinal axis intermediate the opposed sides, wherein said elongated magnetic field duplicates overlapping magnetic fields of alike magnets to further define the effective region of magnetic flux.

19. The apparatus as recited in claim 14, wherein the control device is a switch having a first contact member and a second contact member adapted to move relative to the first contact member in the presence of magnetic flux to control the flow of electric current to the control system.

20. A magnetically operated apparatus for use with an electrically operated system, the apparatus comprising:

a sensor mountable to a first support structure that is adapted to move relative to a second support structure, the sensor having a first contact member that is adapted to move relative to a second contact member in the presence of magnetic flux to open and close a circuit electrically connected to the system, and

a magnetic assembly adapted to operatively interact with the sensor, the magnetic assembly being mountable to a second support member and having an effective region of magnetic flux to actuate the sensor, said effective region of magnetic flux having a given magnitude and a given direction that is in excess of the magnetic flux of a given magnet,

wherein the effective region of magnetic flux allows the first support member to move relative to the second support member a distance having a magnitude that is greater than the magnitude that is obtained using the given magnet.

21. A magnetically actuated apparatus for opening and closing an electric circuit, the apparatus being adapted for use with first and second supports arranged for displacement relative to one another, wherein the apparatus comprises:

a sensor connected to the electric circuit having an open and a closed state, the sensor being mountable to the first support member and comprising a first contact member arranged for displacement relative to a second contact member,

a magnetic actuator mountable to the second support member, the magnetic actuator comprising a plurality of alike, aligned magnetic fields for selectively displacing one of said contact members, each magnetic field having a pole of opposite polarity and a region of magnetic flux of a first magnitude in a given direction wherein like poles of the plurality of magnetic fields are arranged adjacent to one another to provide an effective magnetic flux region of a second magnitude that is greater than the first magnitude in the given direction of any one of said plurality of magnetic fields, the effective magnetic flux region being used to displace one of said contact members,

whereby the effective magnetic flux region allows the first and second support members to be displaced relative to one another in a given direction for a given magnitude, that is greater than the displacement of the first and second members relative to the magnetic flux of any one of the magnet, without any change in the electric condition of the sensor.

22. The apparatus as recited in claim 21, wherein the sensor is a reed switch.

23. The apparatus as recited in claim 21, wherein the plurality of magnetic fields is formed by a pair of alike magnetic fields, each magnetic field having a north pole and an south pole and is oriented with like poles aligned with one another.

23. The apparatus as recited in claim 23, wherein each of the alike magnetic fields has a longitudinal axis extending about the north and south poles, that is normal to an axis defined by at least one of said contact members.

25. The apparatus as recited in claim 21, wherein the electric circuit is connected to a security monitoring system.

26. The apparatus as recited in claim 25, wherein the security monitoring system is settable when the sensor is in either the closed state or the opened state.

27. The apparatus as recited in claim 21, wherein the magnetic flux of each magnet overlaps to further define the effective region of magnetic flux.

28. The apparatus as recited in claim 27, wherein the plurality of magnetic fields is mounted so that the effective region of magnetic flux is oriented normal to at least one of said contact members.

29. The apparatus as recited in claim 28, wherein the first support member is displaceable within a first plane relative to a second plane defined by the second support member, wherein each magnet moves in a given direction relative to at least one of the contact members.

30. The apparatus as recited in claim 21, wherein the plurality of magnetic fields are attached to a bar that further defines the effective region of magnetic flux.

31. The apparatus as recited in claim 30, wherein the first support member is fixed and the second support member is movable.

32. The apparatus as recited in claim 21, wherein the effective region of magnetic flux defines an effective gap in which the second support member is displaceable relative to the first support member, having a given magnitude and a given direction greater than if one magnet is used.

33. The apparatus as recited in claim 21, wherein the first support member is a window frame and the second support member is a window.

34. The apparatus as recited in claim 21, further comprising a magnetizable member magnetized by alike poles of the plurality of magnetic fields, to further define the effective region of magnetic flux.

35. The apparatus as recited in claim 34, wherein the plurality of magnetic fields comprise a plurality of magnets connected to the magnetizable member that are spaced apart from each other such that the magnetic flux of each magnet does not overlap.

36. The apparatus as recited in claim 35, wherein the magnetizable member is a steel bar.

37. A magnetically-actuated switching device for use with a first structure arranged for displacement relative to a second structure, the device opening and closing an electric connection, the device comprising:

a plurality of alike magnets mountable to the second support structure for actuating the contact, each magnetic being arranged adjacent to one another and having alike opposed magnetic fields of opposite polarity of a given magnitude, wherein the magnetic fields of the plurality of magnets combine to form a first and second effective magnetic actuator fields of opposite polarity, wherein each effective magnetic field is capable of moving the contact intermediate the open state and the closed state, wherein each magnetic actuator field has a given magnitude of magnetic flux that is greater than the given magnitude of magnetic flux of any one of the magnets of like polarity, wherein at least one of the magnetic actuator fields is oriented transverse to the magnetic actuation area,

wherein the at least one effective magnetic actuator field allows the first structure to move relative to the second structure in a given direction of a desired distance that is greater in magnitude of that the movement of the first structure relative to the second structure with respect to any one of the plurality of magnet, without a change in the electric condition of the control device.

39. The magnetically actuated apparatus as recited in claim 38, wherein the contact is in the open state in the absence of magnetic flux.

40. The magnetically actuated apparatus as recited in claim 38, wherein the contact is in the closed state in the presence of magnetic flux.

41. The magnetically actuated apparatus as recited in claim 38, wherein the contact is in the closed state in the absence of magnetic flux.

42. The magnetically actuated apparatus as recited in claim 38, wherein he contact is in the open state in the presence of magnetic flux.

43. A magnetically actuated apparatus for opening and closing an electric circuit, the apparatus being adapted for use with first and second supports arranged for displacement relative to one another, wherein the apparatus comprises:

a switch secured to the first support to control the flow of electric current to the electric circuit, the switch assembly having a switch that includes a first contact member arranged for displacement relative to a second contact member to open and close the switch, the first contact member having a switch axis,

a plurality of spaced magnets secured to the second support, each magnet having a pole of opposite polarity wherein like poles of each magnet are arranged with their respective magnetic fluxes contiguous to provide a combined region of magnetic flux that is greater than a region of magnetic flux of each magnet, the combined region of magnetic flux being transverse to the switch axis,

wherein said switch is in an open state when the first contact member is spaced apart from the second contact member,

wherein said switch is in a closed state when the first contact member is in close proximity to the second contact member in the presence of the combined region of magnetic flux, the combined region of magnetic flux biasing the first contact member near the second contact member to permit electricity to flow to the circuit,

whereby the combined region of the magnetic flux permits the first support and the second support to move a greater predetermined distance relative to one another than the magnetic flux of each magnet, without a change in the open or closed condition of the switch.

44. An adjustable magnetic switch for controlling an electronic circuit mountable to first and second support members, the switch comprising:

a control arranged to be secured to the first support member having at least one magnetizable contact means arranged for movement intermediate an open position and a closed position to control electric current to the electronic circuit, the at least one contact defining a contact axis,

a magnetic actuator arranged to be secured to the second support, the magnetic actuator having a magnetic field of opposite alike polarity in a desired direction to define a substantially continuous magnetic actuation field that is normal to the contact axis for moving the at least one contact between the open position and the closed position,

wherein the at least one contact is in a nonsetting position in the absence of magnetic flux from the magnetic actuation field,

wherein the at least one contact device is in the setting position in the presence of magnetic flux from the magnetic actuation field,

whereby the magnetic actuation field allows the first support to move a desired distance relative to the second support so that the magnetic flux of the magnetic actuation field maintain biases at least one contact to the closed position.

45. The switch as recited in claim 44, wherein the magnetic actuator is mountable to an adjustable member that is securable to the second member.

46. The switch as recited in claim 45, wherein the adjustable member is movable relative to the second member to adjustably locate the magnetic actuator to adjust the given direction of the magnetic field of the magnetic actuator.

47. The switch as recited in claim 45, wherein the adjustable member is secured to the second member by a bracket.

48. The switch as recited in claim 45, wherein the adjustable member further comprises a knob or adjustment tool slot to manually adjust the location of the magnetic actuator.

49. The switch as recited in claim 45, wherein the adjustable member further comprises a sensor to automatically adjust the direction of the magnetic actuator relative to the switch means, so that the magnetic field of the magnetic actuator remains in contact with the switch to bias the contact member to the setting condition.

50. The switch as recited in claim 45, wherein the adjustable member is pneumatically moved relative to the switch by a sensing device that automatically activates an pneumatic actuator to adjust the direction of the magnetic actuator so that the magnetic field remains in contact with the switch to bias the contact member to the setting condition.

51. The switch as recited in claim 44, wherein the magnetic actuator comprises a plurality of aligned alike magnetic fields, each magnetic field having opposite alike poles having magnetic flux of a given direction and magnitude, wherein alike poles define a region of effective magnetic flux for actuating the switch.

52. The switch as recited in claim 51, wherein the switch is a reed switch having a first contact member and a second contact member for forming an electric connection.

53. The switch as recited in claim 52, wherein the reed switch is wired to an alarm switch having an open state and a closed state for setting and triggering the alarm.

54. A method of providing a magnetically actuated apparatus for opening and closing an electric circuit, the apparatus being adapted for use with first and second supports arranged for displacement relative to one another, wherein the method comprises:

providing a sensor connected to the electric circuit having an open and a closed state, the switch being mountable to the first support member and comprising a first contact member arranged for displacement relative to a second contact member,

providing a plurality of spaced apart, alike aligned magnetic fields associated with the second support member for selectively displacing one of said contact members, each magnet having a pole of opposite polarity and a region of magnetic flux of a first magnitude in a given direction wherein like poles of the plurality of magnets are arranged adjacent to one another to provide an effective magnetic flux region of a second magnitude that is greater than the first magnitude in the given direction of any one of said plurality of magnets, the effective magnetic flux region being used to displace one of said contact members,

whereby the effective magnetic flux region allows the first and second support members to be displaced relative to one another in a given direction for given a magnitude, that is greater than the displacement of the first and second members relative to the magnetic flux of any one of the magnets, without any change in the electric condition of the sensor.